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Auditory responsiveness of male and female mosquitoes in the vicinity of mating swarms

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Many mosquito species mate in swarms consisting mainly of males and lab studies show that males and females respond to species-specific flight tones of the opposite sex, indicating that sound might guide mosquitoes to con-specific swarms. We tested this hypothesis in the laboratory with two species in the *Anopheles gambiae* complex. Previous studies analysed auditory responses of only 1-to-1 opposite-sex interactions, with inconsistent results. We investigated the acoustic behaviour of single mosquitoes close to a swarm of mosquitoes.

The responses of single females to male swarm sounds and single males to female swarm sounds, were investigated for *An. coluzzii* and *An. gambiae s.s.* (i.e. testing sex x species) at sound levels typical within ~10 cm of a swarm. We tested the effect of two swarm sound levels; 36 dB (close to a typical swarm) and 48 dB. The responses of individual mosquitoes were measured by analysing flight-tone data and 3D flight paths of individual mosquitoes.

Both sexes responded to sound stimuli of both species by increasing their wing-beat frequencies, albeit with sex-specific patterns of response. Whereas, for females there were no differences in their responses to *An. coluzzii* or *An. gambiae* males, males responded significantly more quickly to the sound of females of their own species than to conspecific sound at 36 dB. The findings indicate that both sexes detect swarm sounds within close range of a swarm, but only males are likely to differentiate between swarms of their own vs another species as they approach a swarm.